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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,771	08/20/2001	Kazutaka Yanagita	1232-4412US1	6944

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EXAMINER
GRAYBILL, DAVID E

ART UNIT	PAPER NUMBER
2827	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/931,771	Applicant(s) YANAGITA ET AL.	
	Examiner David E Graybill	Art Unit 2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *43-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *43-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/015,582* .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly the subject matter which applicant regards as the invention.

In claim 43 the scope of the limitation "changing a strength of ultrasonic waves" cannot be determined because the term "changing" implies an initial value, yet, no initial value is recited or can otherwise be determined.

In claim 43 the scope of the limitation "a strength of ultrasonic waves" cannot be determined because the particular property of ultrasonic waves that is imparted with strength is not recited and cannot otherwise be determined.

In the rejections infra, reference labels are generally recited only for the first recitation of identical language.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in-

> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claim 44 is rejected under 35 U.S.C. 102(e) as being anticipated by Yamagata (6103598).

At column 5, lines 15-16 and 61-63; column 6, lines 19-27; column 6, line 53 to column 7, line 12; and column 9, lines 1-4; Yamagata teaches the following:

44. A semiconductor substrate fabrication method comprising: the step of forming an unporous layer 102 on a porous layer 101 formed on a surface of a first substrate 100; the step of adhering a first substrate side of a prospective structure and a second substrate 110 prepared separately to sandwich said unporous layer between the first substrate side and said second substrate; the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped ["immersed"] into an etching solution, and ultrasonic waves are supplied, thereby

exposing a surface of the second substrate side, the etching step moving the second substrate side.

To further clarify the teaching of the etching step moving the second substrate side, it is noted that the supplied ultrasonic waves inherently vibrate, and hence move, the substrate side.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35

U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagata (6103598).

As cited supra, Yamagata teaches the following:

43. A semiconductor substrate fabrication method comprising: the step of forming an unporous layer on a porous layer formed on a surface of a first substrate; the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate; the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side.

However, Yamagata does not appear to explicitly teach the etching step changing a strength of ultrasonic waves which act on the second substrate side. In any case, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine

experimentation and optimization to choose the particular claimed etching strength limitation because applicant has not disclosed that the limitation is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical, and it appears prima facie that the process would possess utility using another strength. Indeed, it has been held that optimization of range limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. As set forth in MPEP 2144.05(II), "Applicant can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. 'The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range.' In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP § 716.02 - § 716.02(g) for a discussion of criticality and unexpected results."

Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamagata (6103598) and Kaji (4980017).

As cited, Yamagata teaches the following:

45. A semiconductor substrate fabrication method comprising: the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;
the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;
the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and
the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side.

However, Yamagata does not appear to explicitly teach the etching step swinging the second substrate side. Nonetheless, at column 1, line 60 to column 2, line 2; and column 2, lines 22-27, Kaji teaches an etching step swinging a substrate 18

side. Moreover, it would have been obvious to combine the invention of Kaji with the invention of Yamagata because it would facilitate etching.

Claims 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Yamagata (6103598), Kaji (4980017) and Matsushita (5071776).

As applied to 45 supra, the combination of Yamagata and Kaji teaches the following:

46. A semiconductor substrate fabrication method comprising:
the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;
the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;
the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and
the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution, and ultrasonic waves are supplied, thereby exposing a

surface of the second substrate side, the etching step swinging the second substrate side.

47. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;

the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and

the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution and, ultrasonic waves are supplied, thereby exposing a surface of the second substrate side, and the etching step swinging the second substrate side.

48. A semiconductor substrate fabrication method comprising:

the step of forming an unporous layer on a porous layer formed on a surface of a first substrate;

the step of adhering a first substrate side of a prospective structure and a second substrate prepared separately to sandwich said unporous layer between the first substrate side and said second substrate;
the removal step of removing said first substrate from the adhered structure to expose said porous layer on a second substrate side thereof; and
the etching step of etching said porous layer while the second substrate side on which said porous layer is exposed is completely dipped into an etching solution and, and ultrasonic waves are supplied, thereby exposing a surface of the second substrate side, the etching step swinging the second substrate side.

However, the combination of Yamagata and Kaji does not appear to explicitly teach the second substrate side supported substantially perpendicular to a plane of vibration of ultrasonic waves, and the second substrate side supported substantially parallel to a plane of vibration of ultrasonic waves, and swinging the second substrate side to cross a plane of vibration of ultrasonic waves. Nevertheless, at column 3, lines 41-44; column 4, lines 6-9; column 5, lines 31-68; column 6, line 56 to column 7, line 19; and column 8, lines 11-23,

Matsushita teaches a substrate 14 side supported substantially perpendicular to a plane of vibration of ultrasonic waves, and a second substrate 14 side supported substantially parallel to a plane of vibration of ultrasonic waves, the second substrate side crossing a plane of vibration of ultrasonic waves. Moreover, it would have been obvious to combine the invention of Matsushita with the invention of the applied prior art because it would facilitate etching.

The prior art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to the group receptionist whose telephone number is 703-308-1782.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is 703/305-3431.

David E. Graybill
Primary Examiner
Art Unit 2827

D.G.

20-Feb-02